

KEKAHA SUGAR COMPANY, BAGASSE STORAGE BUILDING
8315 Kekaha Road
Kekaha
Kauai County
Hawaii

HAER HI-83-A
HI-83-A

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

BAGASSE STORAGE BUILDING KEKAHA SUGAR COMPANY

HAER No. HI-83-A

<u>Location:</u>	Kekaha Road Kekaha County of Kauai Hawaii USGS 7.5 minute series topographic map, Kekaha, HI 1983 Universal Transverse Mercator (UTM) coordinates: 04.431600.2429880
<u>Date of Construction:</u>	1965
<u>Engineers & Builders:</u>	Honolulu Iron Works and Link-Belt Company
<u>Present Owner:</u>	Kekaha MS, LLC
<u>Present Occupant:</u>	Vacant
<u>Present Use:</u>	Abandoned
<u>Significance:</u>	The Bagasse Storage Building is associated with the history and development of Kekaha Sugar Company's mill. It is a good example of a bagasse storage building in Hawaii, which reflects its twentieth century origins in its materials, method of construction, and design.
<u>Report Prepared by:</u>	Don J. Hibbard and Wendy Wichman Architectural Historians Mason Architects, Inc. 119 Merchant Street, Suite 501 Honolulu, HI 96813
<u>Date:</u>	December 2008

GENERAL DESCRIPTION AND LOCATION

The Bagasse Storage Building is located on the premises of the Kekaha Sugar Company's mill site. The 59' x 180' building sits immediately to the southwest of Number 1A Steam Generator to which it supplies bagasse, the cane fiber which remains after the juice has been crushed out of the cane's stalk, for use as fuel. It sits on a concrete slab foundation and has a corrugated metal, front facing gable roof. Rising 44'-2" to the peak of its gable, it is the second largest building remaining on the mill premises.

Two sets of conveyors are associated with the building. A 24" belt conveyor, with a rounded steel cover, delivers the bagasse to the storage building from the crushing mill. Set at a twelve degree twenty minute incline, it spans the 51' between the mill and bagasse storage building and runs up the north face of the storage building to enter at its north gable peak. A transfer platform at the gable peak is enclosed by corrugated metal and measures 8' x 10' and is approximately 10' high, capped by a shed roof. A triangular shaped, metal support bent with cross bracing supports the transfer platform on its north side. A 36" wide metal walkway services the length of the conveyor belt. At the transfer platform the conveyor from the mill dropped the bagasse onto another conveyor belt, situated at a right angle from the first. This feeder conveyor delivered the bagasse into the storage building, running the length of the structure.

A second conveyor, no longer intact, took the bagasse from the bagasse storage building to the boiler house. This 48" wide 172' long distribution and return conveyor ran from inside the north end of the storage building out to the mill, rising at a forty three degree angle. Slats were placed every fifth link to prevent the bagasse from sliding downward. All the conveyors were manufactured by the Link-Belt Company of San Francisco.

The bagasse storage building is nine bays long, with each bay being 20' in length. Steel, 12" I beam columns define the bays. These columns carry the roof's 12" I beam rafters, which in turn support the steel purlins. Reinforced concrete walls rise 5', encasing the lower portion of the columns, before yielding to sheet metal walls that ascend 15' before giving way to corrugated metal walls that encase the remaining 13'-6" to the eave line. At the northern-most bay the floor slopes upward, rising 5' in 10' to a trough beyond which is the transport system to take the bagasse to the boiler. The transport system includes not only a 4' wide belt conveyor, but also a reversible drag line winch with an operator's cab, which traversed the width of the bagasse storage building on a pair of forty gauge rails. The wire cabling of the winch goes up to a two ton traveling crane that spanned the width of the building and ran its length on a pair of rails supported by steel brackets welded to the structural columns. A large rake is attached to the cabling, which was used to move the bagasse to the conveyor belt that delivered the bagasse to the boiler. The bagasse enters the furnace 16' above the traveling grate.

The building has two openings. In the eastern face of the northeast corner a hinged door provides access to the bagasse transport system. In the middle of the south wall a pair of large metal double doors, set in an 18' wide metal frame open on a wood framed shed roof addition to the *makai* (south) side of the bagasse storage building, which was built at some point after 1985.

The concrete slab floor of the *makai* addition is one step below the bagasse storage building's floor. The 59' x 58' addition features a corrugated metal roof which is 18' high at its low point, the *makai* (south) eave line. Its south and west walls are screened, and its east wall has a 12' high metal wall with screening above. A pair of 16'-8" wide openings with hinged double doors penetrate the west wall. Of the two openings, the *makai* opening is the lower, being 20' high, while the *mauka* doorway is 28' high.

HISTORICAL CONTEXT

See the HAER Report (HAER No. HI-83-A) for the Kekaha Sugar Company Sugar Mill Building for the development of the Kekaha Sugar Company's sugar mill.

The use of a separate building to store bagasse became popular in Hawaii during the 20th century, when sugar mills began to generate electricity for their own use and also to sell to the grid. Bagasse when it exits the mill has an approximately forty to fifty percent moisture content, and around three percent sugar content. As bagasse became an increasingly important fuel for not only the operation of the mill, but also the generation of electricity for the larger community, a need arose to store larger quantities of the fuel. A separate building was viewed not only as a way to minimize fire hazards within the mill, but also to allow for a more efficient operation of a mill's boiler plant in the off-season. A metal-frame bagasse storage building was constructed at Kekaha sugar mill during the 1920s or early 1930s. This 53' x 44' building was demolished at some point after 1966, following the completion of the current Bagasse Storage Building. The present building may have been necessitated by a combination of factors, including the construction of the new crushing mill in 1955 which resulted in an increase in the amount of sugar processed, and therefore bagasse produced. Also in that year the new tangentially fired boiler was placed into operation. It burned ninety percent of the bagasse in suspension and ten percent on the grate proper. This type of fuel burning is known as tangential suspension and turbulent combustion, and the new boiler was the first unit built of this type for bagasse burning in the sugar industry worldwide. This new steam generator was much more efficient in its fuel consumption, resulting in less bagasse required to generate the desired quantities of steam. The increased production of bagasse and its reduced consumption most likely resulted in the realization that a larger storage space for this valuable fuel was necessary.

SOURCES

Original Drawings:

Approximately one hundred original drawings and blue prints for the Kekaha Sugar Company's Sugar Mill and its machinery exist. These abandoned drawings were discovered in the mill office, and are incomplete. The plans will be deposited in an appropriate repository, which has yet to be determined. The following drawings provided information for this report.

Title & Sheet #	Date	Office in Title Block	Drawn By	Drawing Number
Fire Protection System	June 25, 1941	Civil Engineering and Survey Department		383
Plan View Bagasse Handling System	May 20, 1964	Link-Belt Company		
Section Through Bagasse Storage Building	May 18, 1964	Link-Belt Company		
Fire Protection System	July 22, 1969	Factory Department	J.K.	
Fire Protection System	Feb 17, 1985	Factory Department	J.K.	

Kekaha Sugar Company Records:

The Kauai Historical Society holds records relating to Kekaha Sugar Company. The following provided useful information:

The Gilmore Hawaii Sugar Manual for 1966 provided information on the bagasse-burning steam plant.

Watchman's Route (map), Kekaha Sugar Co., Ltd., February 17, 1940

Kekaha Sugar Company Annual Reports for 1965 and 1966.

PROJECT INFORMATION

The following documentation was prepared in response to the proposal to demolish the historic property and build housing on the approximately twenty-one acre parcel. The purpose of this documentation is to historically record the architectural and mechanical

elements of the mill and its supporting structures. The property owner and the Hawaii State Historic Preservation Division (SHPD) have agreed that the mill complex is over fifty years old. The SHPD in a July 15, 2008 letter indicated that the office believed the mill complex met the criteria for inclusion in the National Register of Historic Places. SHPD recommended that HABS documentation be completed as a means of mitigating the loss of this historic property. The owner agreed to the SHPD's request for documentation, and after further discussion between Mason Architects and SHPD concerning the presence of intact machinery in the mill, it was decided the documentation would follow Historic American Engineering Record (HAER) standards.

The project manager for the HAER documentation was Polly Cosson Tice of Mason Architects, Inc. Don J. Hibbard, Ph.D. and Wendy Wichman of Mason Architects were the researchers and authors of the reports. Both Polly Cosson Tice and Don Hibbard are architectural historians who meet the Secretary of the Interior's Professional Qualifications in architectural history. Carol Stimson of Mason Architects assisted with the editing and production of the reports. The large-format photographs were taken by David Franzen of Franzen Photography.

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Location Map
U.S.G.S. Kekaha, Hawaii, 1983:

